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Population Aging, Gender and the Transportation System

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Abstract

Across the globe population structures are aging and how older men and women interact with the transport system is increasingly important in maintaining a good quality of life and inclusion in society. The paper reviews three issues: the nature of older people's interaction with the transport system by gender; older people's attitude to travel; and the involvement of older people as road traffic casualties. Patterns of travel in the UK show that older people are heavily dependent on car use, but in the form of more frequent but shorter journeys than younger people. This is especially so for women over 70 years old who, as passengers, are very reliant on males to drive them. Attitudes suggest that there are few obstacles to public transport use, and most agree that bus travel is good, but convenience means many prefer cars. Involvement of older men and women in serious road traffic accidents show that they have lower killed and seriously injured (KSI) rates than 17-24 year old drivers. However, those aged over 70 years exhibit a trend to increasing KSI rates. Analysis of casualty rates of drivers by type of junction, manoeuvre and environmental conditions found that some gender-age groups are overrepresented in certain accident types, including over twice higher serious accidents rates for men, but over representation of older women when driving in poor conditions and turning right and negotiating roundabouts, crossroads and T, Y and staggered junctions. Improvement in engineering design and driver training are suggested together with the need for a greater understanding of the transportation system needs of old and vey old people.

Key words: Aging, gender, travel patterns, bus use, road traffic casualties

1 Introduction

Across the globe in general population structures are aging and it is recognised that the transportation system is vital to allow older people maintain a good quality of life and their inclusion in society (Su and Bell, 2009). It is of no surprise that people's travel patterns and choice of travel modes varies with age and gender (see: Tacken, 1998). This is especially so for older women, who form the majority of the older population due to their longer life expectancy. Yet in the UK they appear highly dependent on males as providing a conduit to the transportation system through being the main car driver. This remains the case despite changes among younger women (and even among those over 60 years old) who are more likely to have driving licences and be car owners. For both genders the very old also face potential social exclusion and lack of access to appropriate transportation when they can no longer access private transport as a driver or passenger.

As Dunnell (2001) points out, transport infrastructures are important to allow independent living. Older people should be able to take charge of their lives during increasingly long and healthy active lifetimes. Tacken (1998) and Metz (2000) also argue that mobility, and unfulfilled travel desires, in old age are important for quality of life. Older person's interaction with the transportation system is influenced by a variety of socio-economic, financial (they generally have less finance but more time) and age and other demographic factors as well as their mobility options. Yet while older person's travel differs significantly from that of younger people, there has been relatively little research on them, particularly about how they vary among the older population by gender among those over 60 years old (Hildebrand, 2003; Siren and Hakamies-Blomqvist, 2004).

The transportation system not only affects the well being of the older population and the social costs and benefits to the economy, but the older population has a direct effect on the economy, for instance in terms of preferential public transport subsidies or of traffic accidents. McGwin and Brown (1999) found that in the USA older (and young) drivers were over-represented in car crashes at intersections and/or involving failure to yield the right of way, unseen objects, and failure to heed stop signs or signals as well as during turning and changing lanes, while females also had fewer accidents per licensed driver in all age groups. The total costs of all traffic accidents are a major cost to the economy, cited by Elvik (2000) at 2.5 per cent of Gross National Product on average among the sample countries, including an economic valuation of lost quality of life, (2.0 per cent for the UK) and 1.3 per cent if lost quality of life is excluded (0.5 per cent for the UK).

This paper reviews the current interaction of those aged over the age of 60 years with the transportation system. Following a literature review, the paper specifically reviews three facets: firstly the nature of older people's interaction with the transport system by gender. This shows a contemporary preference for car ownership and car driving. Secondly, it investigates older people's attitude to travel, including public transport, using available secondary data. Thirdly, it reviews of the involvement of older people as road traffic casualties. To do this data are drawn from the 2005 Great British National Travel Survey (NTS), the Scottish Household Survey (SHS) (2005/6) and STATS 19 (2005) which records road casualties in Great Britain in 2005. The focus

of analysis is on the Scottish population but drawing on UK level from the NTS to extend the sample size. These sections are then followed by conclusions.

2 Literature review

As well as people living longer there is a clear trend of increasing numbers of single households. The demographics of typical Western Europe countries, including the UK and Scotland, are summarised in Table 1 along with projections to 2033, using data from GROS (2011) and Eurostat (2011). The UK as a whole is not yet exhibiting as severe aging as much of Western and Northern Europe but some of the constituent countries are, notably Scotland (see Khan and Raeside, 2008). All fertility rates are below replacement level (2.1) and are projected to remain low, consequently the populations will age. Germany and Italy are expected to have the oldest populations in 2033 closely followed by Scotland. Table 2 illustrates the expected increase of those over the age of 60 years in Scotland and also the increasing proportion of single occupancy housing populated by older people. This clearly will have important implications for the transportation system.

Table 1: ABOUT HERE

Table 2: ABOUT HERE

To a large extent this paper is motivated by Solomon (2000) who highlighted the top four transport issues for older people: 'SARA – Safety, Accessibility, Reliability and Affordability'. These are the four transport requisites for an inclusive society to ensure mobility, inclusion, quality of life and dignity'. The report pointed out that 'The whole philosophy of sustaining people independently in their own homes and meeting their needs in the community depends on their mobility'. Carp (1988) also emphasised the qualities of mobility important to older people: feasibility, safety, and personal control; with other factors that affect mobility including a person's socioeconomic status, physical characteristics of the site and transportation technology.

In relation to the mobility of older people and their quality of life, Metz (2000) found that there is a significant correlation between mobility and quality of life. 'Loss of mobility is seen as resulting in a substantial diminishing of well being, as happens when a person can no longer safely drive a car or when physical movement is significantly impeded through age-related disability.' If this is not provided then problems can occur as shown in a study by Marottoli et al. (1993) who found that driving cessation is associated with the increased depressive symptoms among older people.

Banister and Bowling (2004) explored the perception of quality of life among elderly people. According to their definition, quality of life is sought from three aspects of transport dimension: mobility pattern, locality and social network. They found that, there are clearly links between mobility, social activity, quality of local area and quality of life, demonstrating that over the previous decade, there were significant increases in travel by older people and the quality of their social relationships and an active participation in social activities were becoming a more important part of their quality of life.

Yet the transportation system can present problems, as illustrated by Rosenbloom (2001, 2003) who found that there is an increased feeling of loneliness and isolation among older people, especially for the very old, because of the changing family structures and the reduction of mobility in old age. As their degree of mobility decreases, some older people, proportionally more for very old females, face several serious constraints with little family assistance (see also Raeside et al., 2010).

Older people wish to remain mobile and active to facilitate independent living for as long as possible (Parry et al., 2004). Also, many older people desire to travel and this growing cohort has high expectations about remaining socially active and mobility freedom (see: DETR, 1999; Department for Transport, 2010). Metz (2000) emphasised the benefits of mobility: benefits from actual travel to visit people and places; psychological benefits of movement; healthy exercise benefits; involvement in the local community-support benefits from informal local community networks; and potential travel – the perceived benefits of knowing that a trip could be made if needed.

In relation to the transport needs, Buck (2005) found that the main concerns by older people are crime and accessibility. Particularly for women, the fear of violence and aggression mean that they are less willing to travel after dark and use public transport. This tends to favour car use. Thus for older people driving remains a critical component in their lives; the aims of maintaining social contacts, accessing medical services, and participating at places of worship are pivotal to their quality of life (Rudman et al., 2006; Kua et al., 2007; Vance et al., 2006; and Eby et al., 2003).

Of course, the older age group is not homogenous (e.g. Hildebrand, 2003), with the very old making up an increasing proportion of the population. There are differences between, for instance, those over and under 85 or 70 years old, but most appear heavily car dependent. Mobility is more difficult for people in older years as is shown by: Suen and Mitchell (1998); McGwin et al. (2000); Lyman et al. (2001); King (2007). Alvarez and Fierro (2008) also indicate the declining health conditions and suffering from long-term illness or disability that increase with advancing years. These impairments affect sensory perception such as visual and cognitive functioning and flexibility and therefore make mobility and the maintenance of an independent life considerably more difficult for older people. Mobility difficulties are much more common among older people (King, 2007). In 2005, 45 per cent of older people aged 70 and over in Great Britain experienced mobility difficulties. In addition, there is a strong association between mobility difficulties and household income; households within the lowest household income quintile are more likely to have mobility difficulties than those in the highest household income quintile. The proportions of adults who have difficulties with particular journeys due to personal disability, are much higher and they make fewer trips than those than those without a disability, particularly for older people aged 70 and over.

The transportation system should address the needs of aging, as argued by Mollenkopf et al. (1997) who points out: ‘with advancing age, life for older people is made more difficult through the possible loss of physical functions, through societal processes of differentiation, and through unfavourable environmental and technological conditions. Therefore, mobility becomes a fundamental prerequisite for

the participation in social relations and activities'. In studies in the USA Carr et al. (2006) found that many older Americans with frailty syndromes are still active drivers, and those frail older drivers' characteristics can be summarised as: the majority of current drivers are single, live alone, and do not live in a senior retirement centre, indicating that they may be more independent with regard to their ability to drive. They are also more likely to be employed or volunteering and thus may have a need for more frequent and regular means of transport. Social connections such as the desire to work and stay active or the presence of a family member in the home environment may be more important in continuing driving than physical disability per se. Thus driving is important for participation in the community and active aging.

Because using public transport, walking, or relying on family members may be impractical or undesirable for many older people (Kostyniuk and Shope, 1998), driving remains the primary mode of transport for satisfying travel needs. When driving ability is reduced, mobility is also reduced, leading to a potential decline in emotional well being and quality of life. The resulting isolation from loss of driving privileges has been identified as a primary factor in death from all causes in this age group (Kaplan, 1995). Thus, taking away older people's driving privileges may reduce their (and potentially other's) risk of dying in a motor vehicle crash, but increases their risk of dying from other causes and for others may well reduce their feelings of well being. Alternatively this suggests the need for public transportation and land use systems that can deal with these mobility issues (such as some forms of demand responsive transport).

The increasing importance of driving is highlighted by Knight (2006; 2007a) indicating that: there is generally an increasing trend of holding a full driving licence for people aged 17 and over; and the rates are higher for males than that for females across every age group; in terms of driving licence trends by gender. Since 1999 the proportion of males holding a full car driving licence has remained unchanged while the proportion of females with a licence has increased sharply, in particular, there has been a large increase in the number of older females holding a full driving licence. The Scottish Household Survey (SHS) Travel Diary shows that females are more likely to make less than 2 miles short trips than their male counterparts (Ann and Rowley, 2008). In terms of trip length, males' trips had a median length of 3 miles and females' was 2.3 miles in 2005/06. There were variations in median distance travelled by different age groups. For example, the length travelled by the 60-69 age group ranged from 0.4-15.2 miles (median 2.4), that of the 70-79 age group ranged from 0.3 to 12.7 (median 1.9) and for 80+ age group the median was 1.9 miles.

O'Fallon and Sullivan (2003) studying New Zealanders showed that compared to younger adults (25-59), those aged 65 and over: do fewer trip legs per day; make shorter trips; travel fewer vehicle kilometres per day or year; make most trips with the purpose of social / recreational / personal business; have more 'at home' days than the general population; make a higher proportion of their trips as a passenger in a vehicle and fewer as driver; make most of their trips between 9:30 a.m. and 3 p.m.; and make fewer trips in the evening / night time. Older people appear to be travelling more than a decade ago (see Noble, 2000). As people age, more and more journeys are made as pedestrians rather than car drivers (Dunbar et al., 2004). Noble (2000) notes that: 'Except for the very elderly, in each age group, women are much more likely to be passengers than men. Car travel is partly replaced with travel on foot by men in their

late 50s and 60s and by bus for older men. Travel on foot remains fairly constant for women, but travel by bus increases with age.'

The transportation system can help older people live independently in their own homes for longer, which generally both meets their desires and reduces the cost of long-term care to our society. Furthermore, concessionary fare schemes provide reduced cost travel on public transport and generate additional travel for older people, resulting in a net social welfare gain to society. For example, in 2002 the Scottish National Concessionary Travel Scheme for elderly and disabled people was introduced giving those aged over sixty years free on buses (with similar schemes currently in place elsewhere in the UK) and led to a major increase in bus journeys - 147 million in 2005/6 compared to 103 million before the introduction of the scheme (Knight, 2007b). In order for polices to be effective, there is a need for a greater understanding of the transport patterns and the attitudes of older people towards public transport, and how car travel can be made safer. These are now considered.

3 Travel patterns of the old

To investigate the travel patterns of those over the age of 60 the National Travel Survey (NTS) for the whole of the UK is used, as the sample size relating to Scotland is rather low to allow full analysis. Over the period 2002 to 2005 the distance travelled by car amongst the over 60's has remained fairly constant. The average number of miles driven by males aged 60 to 69 was 7,740 miles and for those males aged 70+ this falls to 4,521. For the whole adult male population the average number of miles driven was 7,994. Females show the same trend but from a smaller base; the corresponding mileages are 5,674, 3,207 and for all adult females 5,979. So although there are more older women, and driver licence holding is increasing among them, they are not driving as much. Evidence from the NTS suggests that older women make fewer trips than males as can be observed from Figure 1, yet at ages less than 60 females make more trips.

Figure 1: ABOUT HERE

How the trips are broken down by mode of travel is displayed in Figure 2. It is clear that for males the main mode at all ages apart from the young, is as a car driver. Females also favour car driving but not as pronounced as males. For the over 70 year old females travel as a car driver falls to third place after walking and being a car passenger. Trends are for car access to rise and the large majority of households have access to at least one car. The trend shows that slowly female car availability is catching up with the car availability of males. In 2005 78 per cent of households with adult females had access to a car and 84 per cent of households with adult males had access to a car, while in 1991 the respective figures were 70 per cent and 79 per cent.

Figure 2: ABOUT HERE

Driver licence holding amongst males aged 61 to 69 and 70+ were 88 per cent and 73 per cent respectively in 2005, while for females the respective percentages were 61 per cent and 33 per cent. However, there has been a pronounced upward trend in older female licence holding since 1991 with the figures for 60-69 year olds in particular showing some convergence (Figure 3). It is interesting to note that since 1991 licence

holding among people aged 17 to 24 has noticeably fallen (by a little more than 24 per cent for each sex).

Figure 3: ABOUT HERE

The use of cars is the main form of transport as shown in Table 3, which is formed from analysis of the 'random adult's' response to the question frequency of using buses in SHS (2005/6). Non bus users were included in 'once a week or less'. Chi square analysis show a significant association between gender and age and the frequency of using buses, ($P< 0.001$), with females more likely to use them frequently and usage highest among the young (17-24 year olds, who often do not have full access to cars) and then gradually increasing frequent bus use with age among those over 59 years old).

Table 3: ABOUT HERE

The main reasons for trips are displayed in Table 3. There is little difference between the genders in regard to trip purpose, except females aged 60 to 69 years shop more than their male counterparts. Those aged over 70 cite shopping significantly more than those aged 60 to 69 years (for both genders). Also of relevance to travel patterns is an individual's mobility, which generally declines with increasing age (Table 4). Older females suffer higher rates of mobility difficulties than the other groups.

Table 4: ABOUT HERE

It seems somewhat surprising that buses are not more frequently used in Scotland given the operation of a concessionary bus scheme meaning free bus travel for the over 60 year olds. To investigate the potential reasons for this, attitudes to bus travel are investigated in the next section.

4 Attitudes to transport

From the data in the Scottish Household Survey (2005/6) difficulties in using various forms of transport can be derived by gender and age for the 2,242 individuals who answered this question (Table 5). This shows that females state more difficulties than males for all transport forms and difficulties increase with age as expected. It is reported that people experience less difficulty with cars and most difficulty with buses.

Table 5: ABOUT HERE

In the SHS (2005/6) a set of questions enquiring about the attitude to bus transport were asked using a five point Likert scale (1 = strongly agree and 5 = strongly disagree) to the 'random adult'. The distribution of answers to these questions for those aged over 60 years for each gender are listed in Table 6. The means of each question for each gender were tested using a t-test to determine if the mean is significantly less than 3, the neutral position. All means came out as significantly lower than 3 at $P < 0.001$, indicating agreement with the statements.

Table 6: ABOUT HERE

Thus there is agreement that buses are frequent, clean, comfortable, safe and simple and cheap to use. From answers to questions why they do not use buses 30 per cent of older males and 21 per cent of older females stated they had a car and it was easier to use it, and among older males and older females 23 per cent and 25 per cent respectively said that there was no need to use a bus. Twenty per cent of older males and 31 per cent of older females stated that health issues were a reason for not using buses. Thus it seems that attitudes to buses are positive for both older males and females, yet the car is preferred it seems mainly on the basis of convenience.

Inconvenience was the main reason for not using buses, cited by 15 per cent of older men and 8 per cent of older women. Interestingly Su and Bell (2009) found that older travellers had great difficulties with multiple stop trip chains, rather than single, trips. Safety and comfort were rarely cited as a major reason for not using buses: 'don't feel safe' cited by 3.9 per cent of older males and 5.1 per cent of older females; and uncomfortable cited by 3 per cent of older men and 2 per cent of older women.

A dichotomous variable was created from the question 'frequency of using local bus service?' coded as a 1 if used buses more than once a week and zero otherwise. (Of those over the age of 60 years 24.9 per cent of males and 33.7 per cent of females used buses more than once per week). The agreement questions were used along with age group, gender and a dummy variable which recorded if the individual was in an area of multiple deprivation (defined as among the 15 per cent poorest in Scotland as measured by the Scottish Index of Multiple Deprivation) to create a binary logistic regression model to predict using buses more than once per week. Those living in more deprived areas generally have lower incomes and lower access to cars as well as suffering various area based disadvantages. Because of inherent correlations in the agreement questions these were reduced to three components by applying factor analysis with varimax rotation. The factors formed are illustrated by their rotated component matrix displayed in Table 7 along with the percentage of variances accounted for.

Table 7: ABOUT HERE

The components are labelled 'service frequency', 'cleanliness, comfort and security' and 'information and fares'. The results of the logistic regression model are presented in Table 8. The model fits reasonably well correctly predicting 97.1 per cent of those who used buses more than once per week, although it only had an overall prediction rate of 60.2 per cent.

Table 8: ABOUT HERE

It is suggested from this model that for buses: service frequency, cleanliness, comfort and security are not significantly important to older people; but information on services and fares are significant. Those over 70 years of age and females are more likely to uses buses more than once per week as are those who live in more deprived areas.

5 Road casualty Involvement

We now consider Killed and Seriously Injured (KSI) road traffic casualties, drawing on data from the STATS 19 data record over the period 1991 to 2005 for Scotland. These data are available from the Economic and Social Science Data Service (www.ESDS.ac.uk, 2011). Changes in the KSI rates (computed by dividing observed KSI counts by numbers sex-age group) over the period 1991 to 2005 for each of the older sex-age groups are plotted in Figure 4.

Figure 4: ABOUT HERE

Overall males seem to be more vulnerable to KSI involvement than females but for both genders those over 70+ years have higher rates of KSI involvement than those aged 60 to 69 years. Conducting loglinear analysis as described by Foster et al. (2006) shows that there is a significant downward trend in KSI rates over time and that there is a significant difference between genders (on average female rates were less than 0.45 than males, $P = 0.02$). In regard to age those in age groups 60-69 and 70+ were significantly less likely to be involved in KSI than those aged 25-59 (on average by 0.44 and 0.09 for the respective age groups 60 to 69 and 70+, P values = 0.03 and 0.04 respectively). These age groups were of course much lower than those aged 17 to 24 years. However, examining the combined effect (i.e. the interaction) of being female and aged 60-69 and 70+ showed a near significant uplift in KSI rates of 0.13 and 0.34 respectively (both having P values = 0.06).

Variation by rates of involvement in KSI casualties by age and gender are displayed in Figure 5 for drivers, passengers and pedestrians. It is clear that young drivers are the most vulnerable to KSI and the same age group are most vulnerable as passengers. However, it is noticeable that rates of involvement increase for those over 70 years and especially so for older females. The effect is more pronounced for pedestrians and those over the age of 70 years become the most vulnerable age group for female pedestrians.

Figure 5: ABOUT HERE

In order to determine if there were any significant differences in KSI with age and gender with type of manoeuvre, weather/road conditions and junction type loglinear analysis was performed for each manoeuvre or environment or junction type. If there was a significant difference in KSI at the 5 per cent level for each road, manoeuvre, environment type then the differences from expected values are displayed in Table 9.

Table 9: ABOUT HERE

In general older females (over 70 years) have greater involvement as KSI casualties than one would expect, especially when negotiating turning right, roundabouts, T, Y or staggered junctions and crossroads. There is a significant difference from older males. It is interesting to note that 60-69 year old females had a relatively lower rate than 70+ year old females each type of junction. The less than expected casualties for condition of darkness with no lights is a reflection of fewer than expected older females travelling in unlighted conditions.

Thus older people, especially females seem less at risk of KSI involvement than younger people. But it is notable that KSI rates increase for those aged over 70 years and this increase is greatest for women. There are some interesting and significant differences by type of manoeuvre, road condition, environmental factors and junction type, as discussion above.

6 Conclusions

The population is aging and this seems to be accompanied by increased car usage by older people, but in the form of more frequent but shorter journeys. In the near future there will be more older female drivers and licence holding amongst this group is increasing dramatically. Older women tend to be most represented amongst car passengers. As access to transport is a major combatant of social exclusion it seems that transport policy needs to be developed to allow older people more access to cars or that public transport needs to be significantly improved to more effectively meet their needs. This suggests that past and current policies which aimed to achieve modal switching to public transport have not fully met the needs of older passengers, and perhaps other forms such as demand responsive travel that can better handle multiple stop trip chains need further consideration. The dominant form of public transport in Scotland, buses, are only used more than once a week by around 25 per cent and 33 per cent of older men and women use buses.

Consideration of attitudes to bus travel indicates that older people, especially women in Scotland, are generally favourable to bus use. The reasons for not using buses are that car use is more convenient and buses are not needed. In the literature reasons for not using buses is often cited as concerns over safety, comfort and inconvenience but data from the Scottish Household Survey indicated relatively little evidence to support these concerns.

Considering casualties involved in Killed and Seriously Injured traffic accidents, older people have less involvement than younger groups, however, those over 70 years especially women show increasing KSI rates. Older women appear more at risk when driving in poor conditions and turning right and negotiating roundabouts, crossroads and T, Y and staggered junctions. This points to the need to undertake more research into engineering solutions to helping older people whose cognitive skills are declining and this is especially needed for women as well as improved driver training and cognitive skill retention and development.

More generally, the socio-political system is changing somewhat to meet the demands of the elderly, including in the area of transport, partly because of their increasing relative size and voting power. However, it should be recognised that once pro-aged polices are introduced policy makers (e.g. free bus passes) they are difficult to reduce or change as they will face opposition from interest groups, and those users negatively affected (potential losers) but get little support from non-user or user beneficiaries (winners) (see for instance: Feitelson and Solomon, 2004). So the long-term impacts of policies must be carefully considered so as to avoid future constraints on innovation and change.

There will be an increasing proportion of the population aged over 60 years in most countries and there will be many more very older females. Older females and males

are not homogenous groups and greater segmentation (e.g. into finer age categories or by area of residence etc.) and an improved understanding of their travel needs is required. These issues will need to be addressed by the transportation system in order to ensure that older people can be actively and safely incorporated in society. This gives major challenges to policy formation and research.

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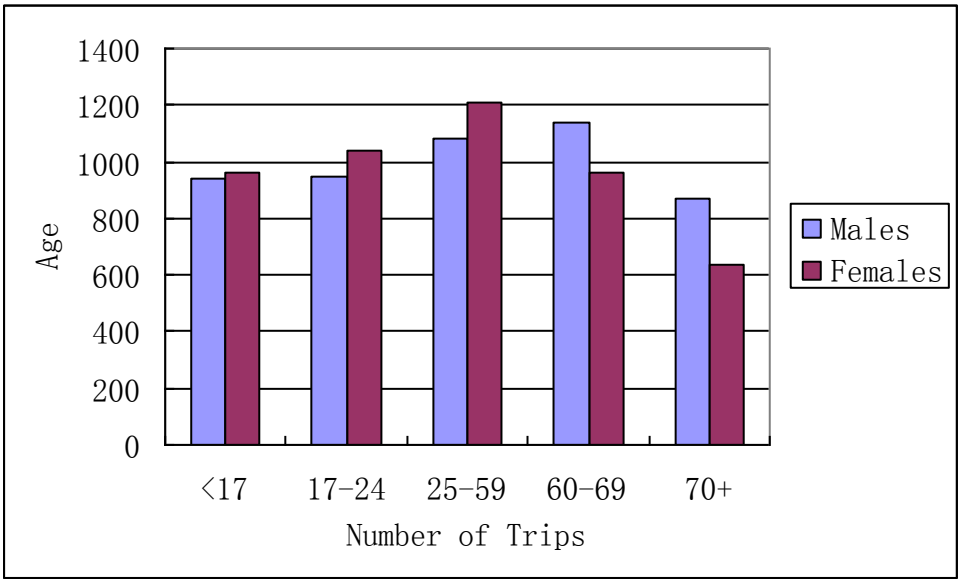
Figure 1 Number of trips made by age and gender*



* How the trips are broken down by mode of travel is displayed in Figure 3.

Figure 2 Mode of travel by sex and age

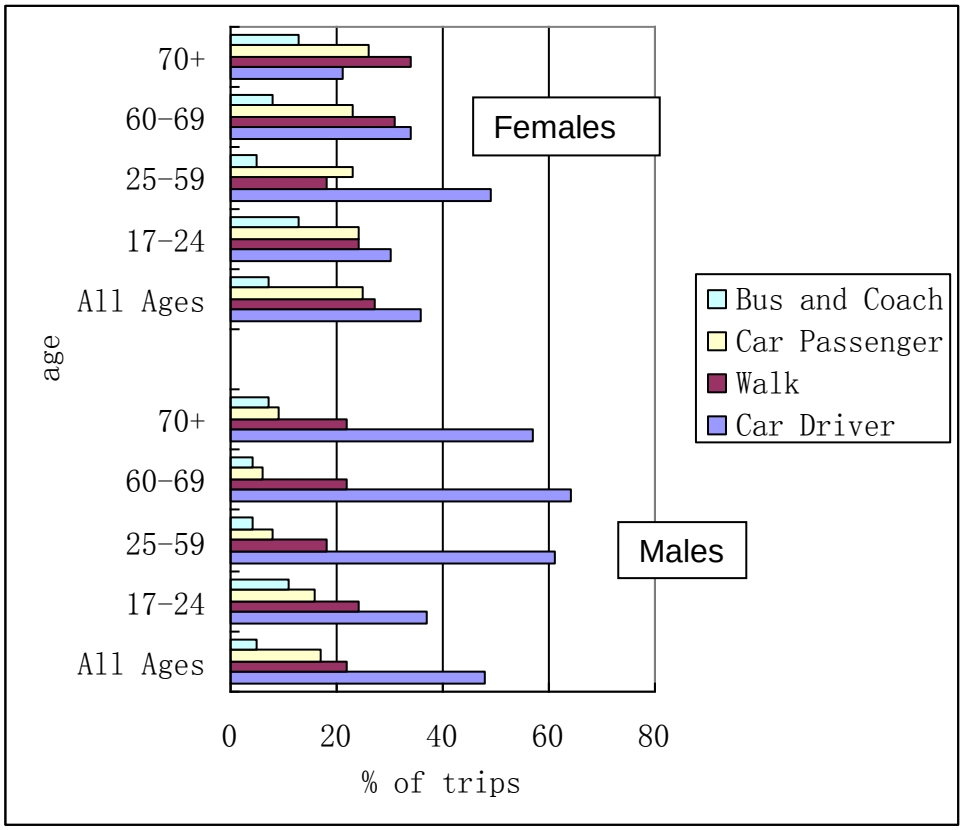


Figure 3 Trends in driver licence holding

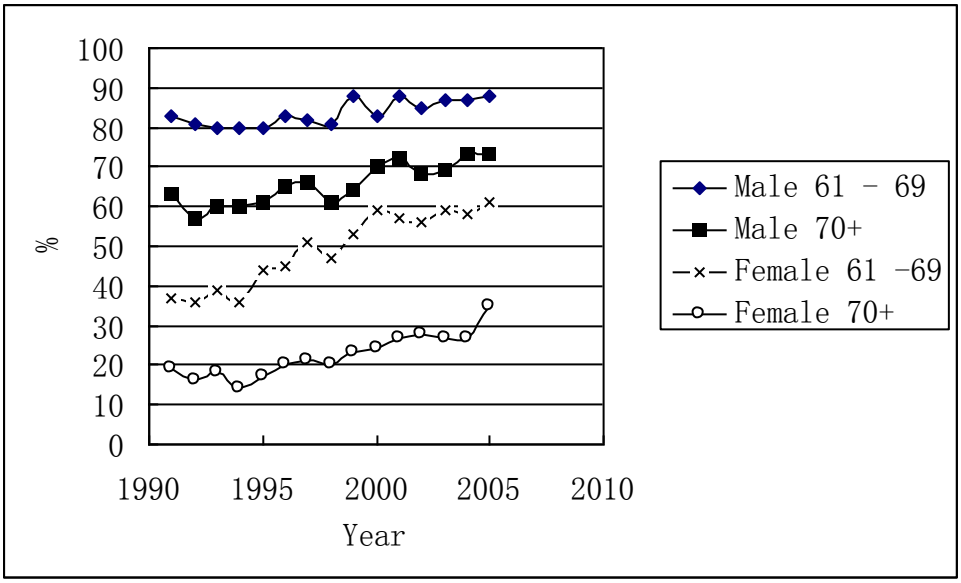


Figure 4 Trends in killed or serious injury (KSI) accident involvement by age and gender group

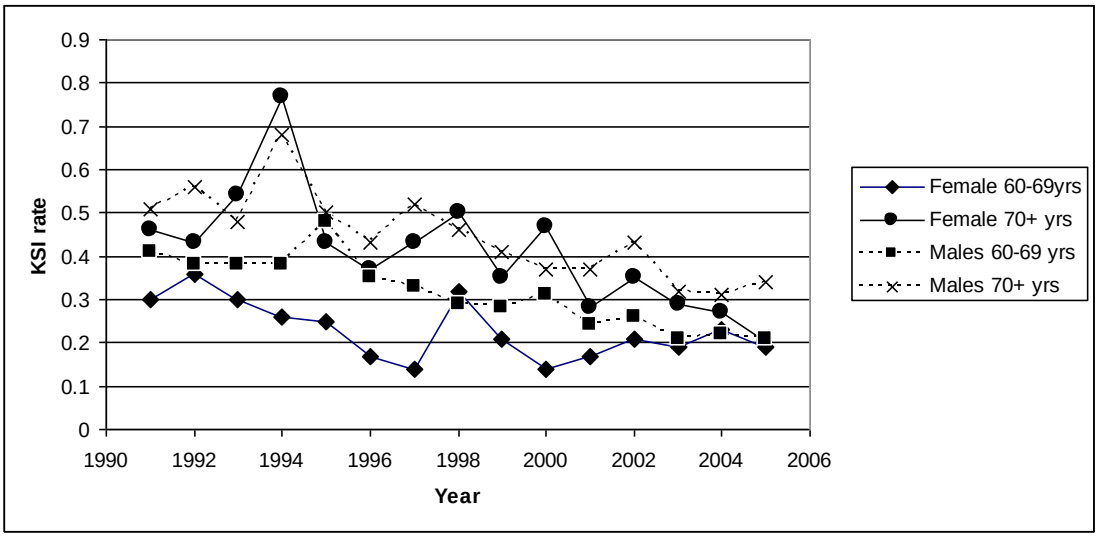
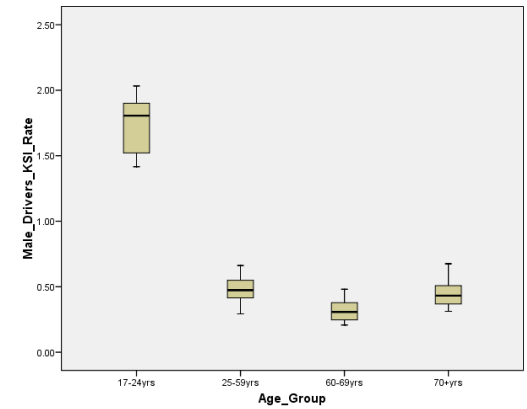
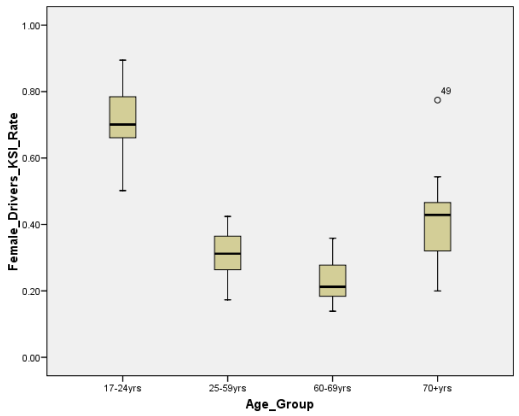


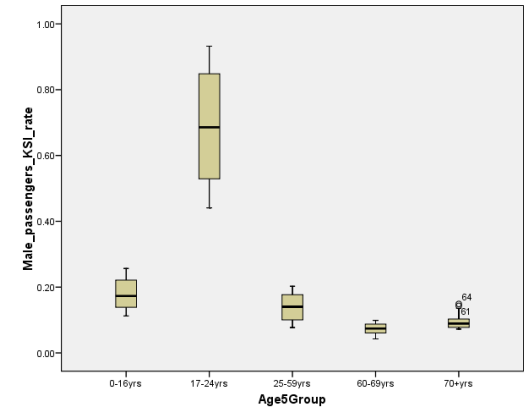
Figure 5 Boxplots of killed or serious injury (KSI) accident involvement by age and gender



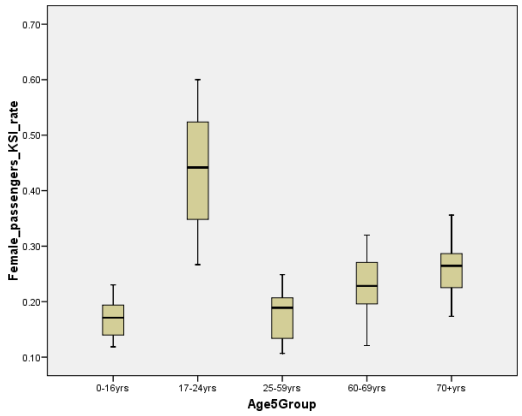
Male drivers



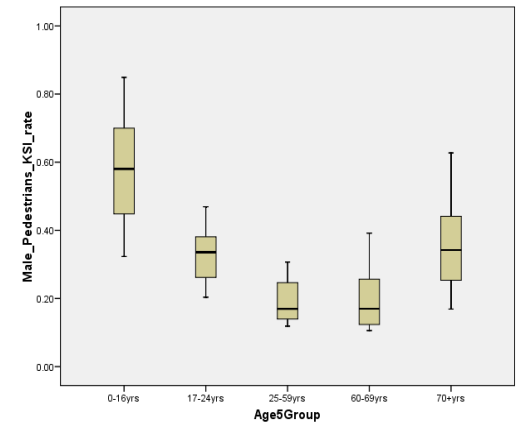
Female drivers



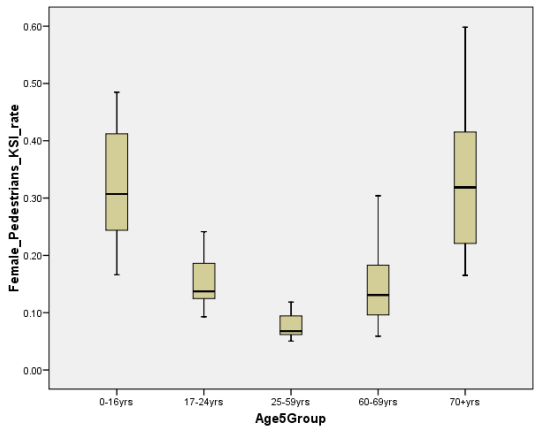
Male passengers



Female passengers



Male pedestrians



Female pedestrians

Table 1 Demographics of Western Europe and aging

Country	Median age	% over the age of 60 years in 2008	Projected % over the age of 60 years in 2033	Total fertility rate
Scotland	41	22.62%	31.60%	1.8
France	40.1	21.82%	29.96%	1.9

Germany	51.7	25.23%	36.44%	1.3
Italy	43.3	25.83%	35.37%	1.4
Norway	54.4	20.49%	28.23%	1.9
Spain	40.2	21.73%	31.09%	1.6
Sweden	53.4	24.30%	29.16%	1.9
United Kingdom	39.9	21.93%	27.25%	1.9

Table 2 The increasing proportion of over 60-year-olds in Scotland

		Percentage of population			**Single person households**		
Sex	**Age**	**2008**	**2033**	**% change**	**2008**	**2033**	**% change**
Male	60-69	5.19%	5.88%	13.29%	2.07%	2.54%	22.71%
	70+	4.73%	8.36%	76.74%	2.83%	2.71%	-4.24%
Female	60-69	5.65%	6.78%	20.00%	3.33%	2.82%	-15.32%
	70+	7.04%	10.57%	50.14%	8.32%	11.00%	32.21%
All	60-69	10.84%	12.67%	16.88%	5.40%	5.36%	-0.74%
	70+	11.78%	18.93%	60.70%	11.15%	13.71%	22.96%
	> 60 yrs	22.62%	31.60%	39.70%	16.55%	19.07%	15.23%
		5169	5544		2331	2813	

Table 3 Frequency of use by bus users by age and gender

		More than once per week	**Once a week or less**	**Total**
Male	17-24 yrs	34.93%	65.07%	1235
	25-59 yrs	14.31%	85.69%	7524
	60-69 yrs	22.35%	77.65%	1831
	70+ yrs	27.51%	72.49%	1839
	Total	2423	10006	12429
Female	17-24 yrs	40.17%	59.83%	1395
	25-59 yrs	20.88%	79.12%	9137
	60-69 yrs	32.99%	67.01%	2290

	70+ yrs	34.40%	65.60%	2625
		4126	11321	15447
Overall	Total	6550	21326	27876

Table 4 Main purpose of trips and mobility difficulties by age and gender

		Main purpose of trip (%)					
Gender	**Age**	**Shopping**	**Visiting friends**	**Business**	**Commuting**	**Sport/ entertainment**	**Mobility difficulties**
Male	60-69	29	14	19	10	7	21
	70+	38	17	19	2	8	38
Female	60-69	36	18	17	6	8	23
	70+	39	18	21	1	8	50

Table 5 Difficulties in using various forms of transport for those over the age of 60 years

		Difficulty in using			
Gender	Age	Bus	Taxi	Train	Car
Male	60-69 yrs	18.87%	5.99%	13.76%	6.44%
	70+ yrs	26.01%	10.30%	19.68%	10.14%
Female	60-69 yrs	24.29%	9.65%	18.53%	9.46%
	70+ yrs	40.32%	16.92%	25.83%	15.41%

Table 6 Agreement with statements relating to bus use in Scotland for males and females aged over 60 years

Gender	**Question**	**N**	**Mean**	**Std. Error Mean**
Male	Agreement - buses are frequent	1615	1.98	.023
	Agreement - service runs when I need it	1607	2.05	.025
	Agreement - service is stable and isn't regularly changing	1606	1.90	.021
	Agreement - buses are clean	1616	2.02	.023
	Agreement - buses are comfortable	1616	2.09	.024
	Agreement - feels personally safe and secure on the bus	1616	1.79	.017
	Agreement - simple deciding the type of ticket I need	1473	1.57	.017
	Agreement - finding out about routes and times is easy	1564	1.89	.022
	Agreement - easy changing from buses to other forms of transport	1442	2.04	.025
	Agreement - fares are good value	1402	1.59	.024

Female	Agreement - buses are frequent	2668	2.02	.020
	Agreement - service runs when I need it	2662	2.02	.019
	Agreement - service is stable and isn't regularly changing	2635	1.93	.018
	Agreement - buses are clean	2674	2.07	.019
	Agreement - buses are comfortable	2675	2.05	.018
	Agreement - feels personally safe and secure on the bus	2675	1.84	.014
	Agreement - simple deciding the type of ticket I need	2442	1.53	.012
	Agreement - finding out about routes and times is easy	2590	1.88	.017
	Agreement - easy changing from buses to other forms of transport	2369	1.97	.018
	Agreement - fares are good value	2274	1.55	.018

Table 7 Rotated component matrix of agreement questions on views of buses

	Component		
Question	1	2	3
Agreement - buses are frequent	.855		
Agreement - service runs when I need it	.852		
Agreement - service is stable and isn't regularly changing	.722		
Agreement - buses are clean		.859	
Agreement - buses are comfortable		.829	
Agreement - feels personally safe and secure on the bus		.666	
Agreement - simple deciding the type of ticket I need			.766
Agreement - finding out about routes and times is easy			.664
Agreement - easy changing from buses to other forms of transport			.652
Agreement - fares are good value			.585
Percentage of variation accounted for	22.42%	20.85%	20.32%

Table 8 Coefficients of Logistic Regression model to explain the likelihood of using buses more than once per week

Variable	B	S.E.	P value	Odds Ratio
service frequency	.008	.039	.831	1.008
cleanliness, comfort and security	.070	.041	.084	1.073
information and fares	-.094	.043	.029	.911
70 years and over	.247	.074	.001	1.280
Female	.173	.075	.021	1.189
Live in 15% most deprived	.726	.104	.000	2.066
Constant	.049	.072	.498	1.050

Table 9 Significant variation for gender and age with manoeuvre, road, environment and junction type

	Age	Left Hand Bend	Right Hand Bend	Turning Right	Daylight No Lighting	Weather Raining No High Winds	Light Conditions Daylight	Darkness Lights	Darkness No Lights	Road surface Dry	Road Surface Wet	Roundabout	T. Y or Staggered Junction	Crossroads
Male	50-69	-37	-11	-22	0	-5	9	0	-14	-1	-8	-40	-22	-14
	70+	34	3	18	10	2	19	-10	-3	13	2	49	18	12
Female	50-69	40	44	22	6	80	16	-20	25	10	24	6	21	13
	70+	3	27	47	19	63	41	12	-8	22	22	43	39	62